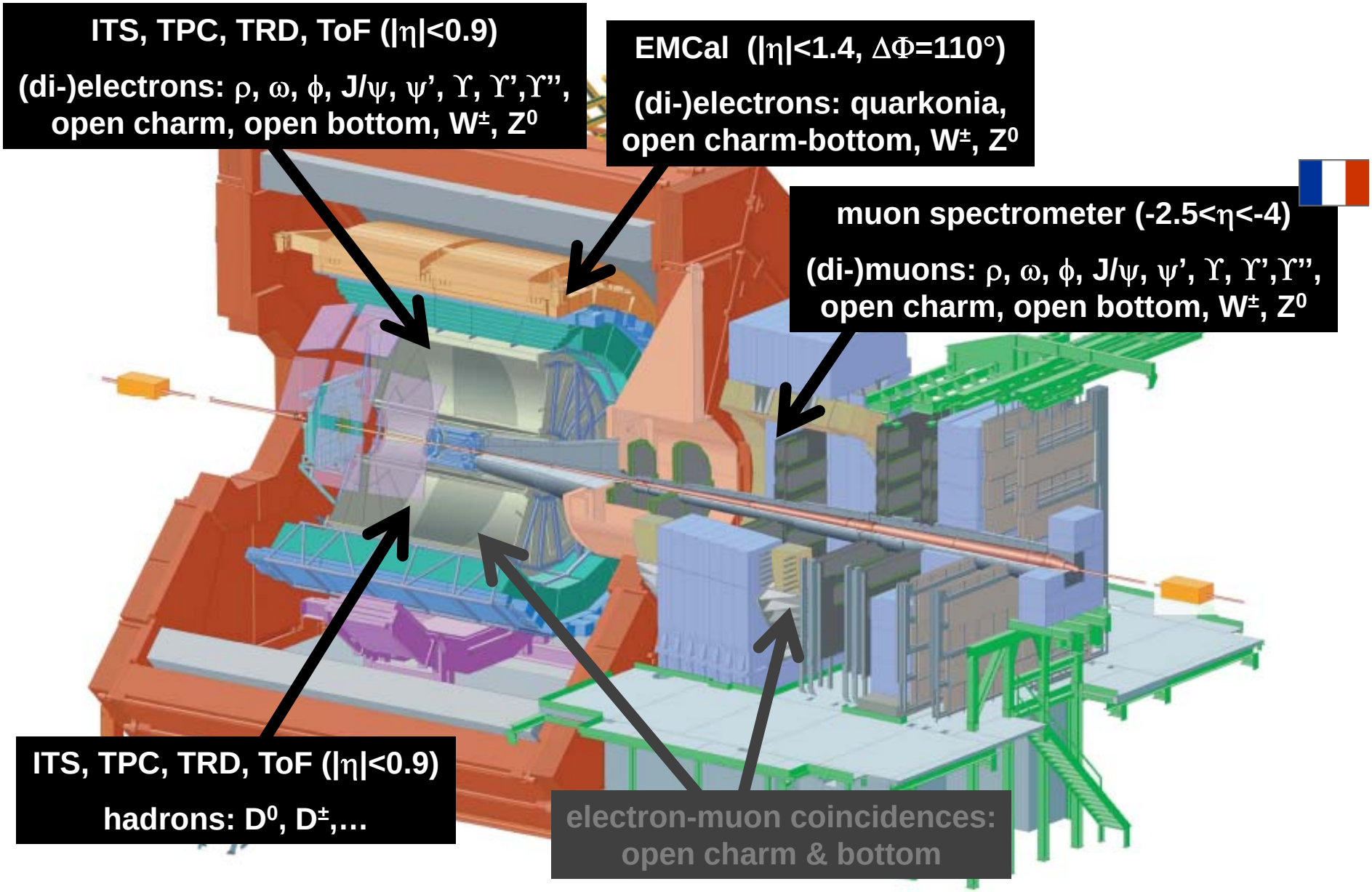
Saveurs lourdes (& leptons) avec ALICE



ALICE-PWG (Physics Working Group) et sous groupes

- PWG1 : “detector performances” (Jouri Belikov)
- PWG2 : “soft physics” (Luciano Ramello & Christian Kuhn)
- PWG3 : “heavy flavours” (Federico Antinori & Gines Martinez)
- PWG4 : “jets and photons” (Andreas Morsch & Yves Schutz)

→ • 3 sous groupes:

  - PWG3-electrons (Silvia Masciocchi)
  - PWG3-hadrons (Andrea Dainese)
  - PWG3-muons (Philippe C.)

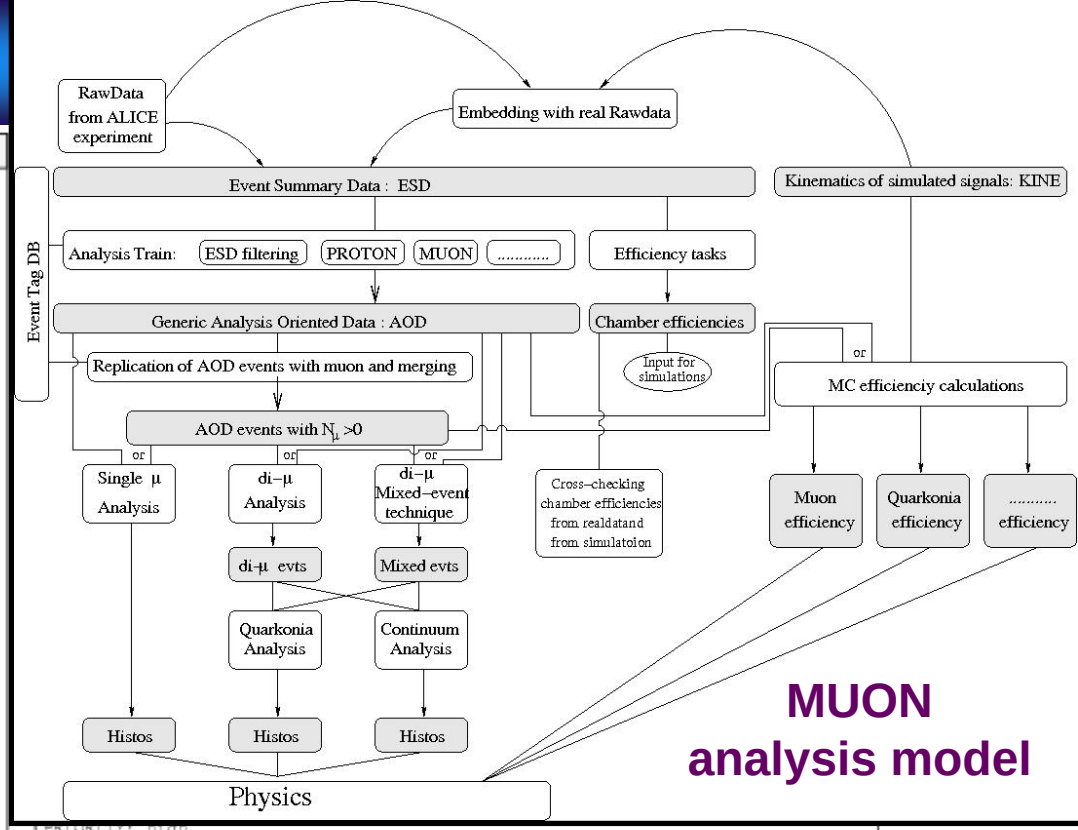
PWG3-MUON

- buts :
  - finaliser l'ensemble du software
  - établir les stratégies d'analyse
  - étudier les performances de l'ensemble du détecteur au démarrage
  - préparer les premiers papiers
- moyens :
  - MUON-analysis model & MUON-analysis to-do-list (next slide)
  - mailing-list : 43 membres (29 français, 8 italiens), ~ 25 actifs (dont 6 étudiants en thèse et 5 postdocs français)
  - réunions EVO ou au CERN tous les mois avant les réunions PWG3
  - résumé des activités dans les réunions PWG3 tous les mois et dans les réunions offline

Analysis model & to-do-list

May 04, 09 15:27 **ToDoList_Analysis_Apr09.txt** Page 1/5

```
-----------------------------------------------------------------------
- New items Apr09
-----------------------------------------------------------------------
38- Adapt AliGenMUONCocktailpp to PbPb collisions at 5.5 TeV. This implies
1) updating the cross-sections at 5.5 TeV (already done),
2) get resonance pt & y parameterisations at 5.5 TeV (already done)
3) update AliGenCorrHF at 5.5 TeV
4) write a coktail
STATUS: could be done in June-July 09
PEOPLE: Smbat & Nicole
PRIORITY: high

39- J/psi polarization in cocktail(s) for PDC09 production
STATUS: done, to be cross-checked and committed
PEOPLE: Livio, Roberta & Enrico
PRIORITY: high

-----------------------------------------------------------------------
- current items
-----------------------------------------------------------------------
7- Version 0 of Muon Pair Analysis
see http://pcrochet.home.cern.ch/pcrochet/Pwg3Analysis_April08.jpg (from Gines)
Output should be MUON-AOD with basics event information (trigger, vertex,
centrality...) and pair information.
STATUS: committed, need to check that it still works with new code developments
PEOPLE: Pietro, Enrico, Roberta
PRIORITY: high

9- Version 0 of mixed muon pair generation Analysis Task (Oct07)
mixed pair to be produced from AOD, output should be identical to that of
item # 7
STATUS: in progress
PEOPLE: Alessandro, Antonio
PRIORITY: high

11- Version 0 of Single Muon and Muon Pair Analysis Tasks from MC (Oct07)
Should be included in item # 7 and activated by means of a flag
STATUS: needs item # 16 ready
PEOPLE: Enrico, Roberta, Nicolas
PRIORITY: high

14- Generation of muon pp minb events with Fluka (Oct07)
STATUS: bugs found, waiting for Fluka to be available on the grid.
For recent developments, see talk by Marek Kowalski at
http://indico.cern.ch/conferenceDisplay.py?confId=27911
PEOPLE:
PRIORITY: medium

16- Analysis task for association of reconstructed tracks in ESD with partic
in the kinematics. The idea is to re-do what RecoCheck what doing in MUON
module. RecoCheck was broken when track.root file dissapeared (Oct07)
STATUS: working version committed see documentation in http://indico.cern.ch
erialDisplay.py?contribId=5&sessionId=2&materialId=slides&confId=45372
code maintenance in progress
PEOPLE: Alessandro, Artur
PRIORITY: high

17- Studying the muon and quarkonia efficiencies with and without underlying
event (with new geometry segmentation).
STATUS: under development, see Tinku's slides at
http://indico.cern.ch/conferenceDisplay.py?confId=30483
PEOPLE: Tinku
PRIORITY: medium

28- Adapt AliGenMUONCocktailpp to pp collisions at 10 TeV. This implies
1) updating the cross-sections at 10 TeV,
2) get resonance pt & y parameterisations at 10 TeV
3) update AliGenCorrHF at 10 TeV
4) update the cocktail
```



MUON analysis model

```
PRIORITY: high

33- Construction of efficiency matrices for single muons
STATUS: in progress
PEOPLE: Xavier
```

- **information available on the web**
- **people & priority assigned to each item**
- **items treated according to priorities**
- **coordinator analysis code: Roberta Arnaldi**
- **code in $ALICE_ROOT/PWG3**

```
- closed items Apr09
-----------------------------------------------------------------------
6- Version 0 of Single Muon Analysis Task (Oct07)
see http://pcrochet.home.cern.ch/pcrochet/Pwg3Analysis_April08.jpg (from Gines)
```

De ALICE-PWG (Physics Working Group) à ALICE-PWG3-MUON-PPG (Paper Preparation Group)

- PWG1 : “detector performances” (Jouri Belikov)
- PWG2 : “soft physics” (Luciano Ramello & Christian Kuhn)
- PWG3 : “heavy flavours” (Federico Antinori & Gines Martinez)
- PWG4 : “jets and photons” (Andreas Morsch & Yves Schutz)

→ • 3 sous groupes:

- PWG3-electrons (Silvia Masciocchi) → 2 PPGs (dont J/ψ)
- PWG3-hadrons (Andrea Dainese) → 4 PPGs
- PWG3-muons (Philippe C.)

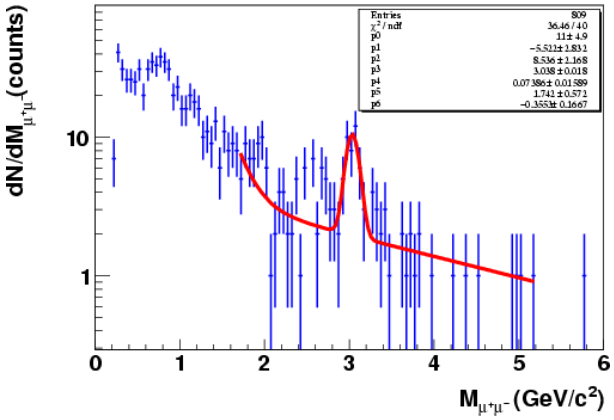
→ • 4 “Paper Preparation Groups”

- PPG1 : J/ψ (Roberta Arnaldi, dep. Daniel Tapia Takaki)
- PPG2 : single muons (Philippe C., dep. Philippe Pillot)
- PPG3 : “technical papers” (detector experts)
- PPG4 : low mass resonances (tba)

MUON physics papers PPG1 & PPG2

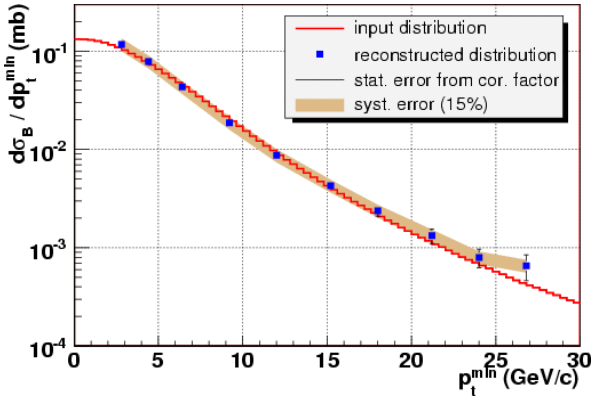
- **PPG1: J/ψ production (pp @ 7 TeV)**

  - **1st option: (very fast publication) integrated inclusive cross-section only to be competitive time-wise with other LHC experiments**
  - **2nd option: (less fast publication) differential cross-section with unfolding of secondary J/ψ from B decay & polarization**
  - **statistics estimate*:**
  ~10000 J/ψ in $-2.5<\eta<-4$ & $0<p_t<10$ GeV/c**



- **PPG2: heavy-flavour cross-section from single muons (pp @ 7 TeV)**

  - **analysis is strongly model dependent but essential input for unfolding J/ψ signal & for open heavy flavour R_{AA}**
  - **statistics estimate*:**
  ~$3\cdot10^6$ μ from c & b decay in $-2.5<\eta<-4$ & $1<p_t<12$ GeV/c**



***2-3 months data taking with muon (single) trigger & F. Antinori July'09 scenario for luminosity & machine efficiency**
****http://indico.cern.ch/conferenceDisplay.py?confId=70468**

Status of the analysis framework & papers

- analysis framework:
  - new wagons included in the PWG3-MUON analysis train
    - production of standard-AOD with MC branch
    - production of MUON-AOD (note: size reduction factor ~ 125 from ESD i.e. 1 nominal pp run @ 14 TeV ~ 5 TB only)
    - analysis wagons: single muons, dimuons (continuum & charmonia)
    - analysis tasks for muon tracking & trigger chamber efficiency (will be moved to the PWG1 train)
    - analysis tasks for acceptance & efficiency corrections using CORRFW: single muons, dimuons (continuum & charmonia)
  - train tested locally & on grid/proof, being included in the ALICE official train
- papers:
  - strategy to present the data is being discussed
  - contact established with several theoreticians
  - PWG3-sub-groups joined action to get theoretical predictions
  - PPG1 draft 0 already available

Responsabilités françaises

- Coordination du groupe de travail PWG3
- Coordination du groupe de travail PWG3-MUON
- Coordination du offline-MUON
- Adjoint coordination du offline-MUON
- Coordination des productions PDC-MUON
- Coordination du PPG2 et du PPG4 (tbc)
- Adjoint coordination du PPG1 et du PPG2
- Chair de l'editorial board de ALICE-MUON
- 3 français sur 5 membres de l'editorial board de ALICE-MUON
- Leaders dans plusieurs aspects du traitement et de l'analyse des données (e.g. trigger, alignement, corrections d'efficacité)